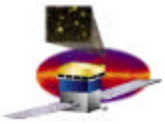


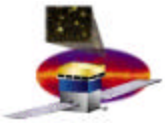
Iterative Recon

J. Eric Grove
NRL



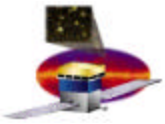
Iterative recon

- Concerns
 - How accurate does CAL energy seed to Kalman need to be?
 - At low E, small fraction of E reaches CAL.
 - For $E_{inc} = 100 \text{ MeV}$, $\langle E_{obs} \rangle \sim 50 \text{ MeV}$
 - For $E_{inc} = 50 \text{ MeV}$, $\langle E_{obs} \rangle \sim 20 \text{ MeV}$
 - At high E, most E blows out the back.
 - For $E_{inc} = 10 \text{ GeV}$, $\langle E_{obs} \rangle \sim 6 \text{ GeV}$
 - For $E_{inc} = 100 \text{ GeV}$, $\langle E_{obs} \rangle \sim 40 \text{ GeV}$
 - Is a simple CAL sum good enough?
 - Or do we need to implement simple corrections prior to TkrRecon?
 - We *could* add TKR energy by scaling number of TKR hits.
 - We *could* scale Eobs by an average correction factor:
 - » use xtal I D to give crude angle estimate and scale Eobs by an average profile correction factor (which is a fcn of Eobs and theta).



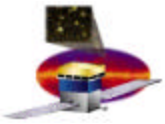
Iterative recon

- Concerns
 - Does TKR direction recon depend on species?
 - Does it matter if we pretend a heavy ion is an EM shower?
 - CAL needs TKR track to correct individual xtal energies
 - For best energy resolution
 - To correct for diode failures (need to account for light taper).



Iterative recon

- Outline of process
 1. CAL: Convert to charge units
 - Use electronic calib. Convert from ADC bins to charge at FEE.
 2. CAL: Calculate energy in each xtal
 - Convert to MeV at center of xtal. Assume position = center of xtal.
 3. CAL: Calculate total energy deposited
 - Simple xtal sum
 4. CAL+TKR: Make simple energy corrections (necessary?)
 - Scale by avg-profile correction, $f(E_{\text{obs}}, \theta)$?
 - Add simple TKR energy correction, i.e. scale by num hits?
 5. CAL: Simple energy centroid (necessary?)
 - Calculate centroid in XZ and YZ planes using logI D positions.



Iterative recon

- Outline of process (cont.)

- 5. TKR: Direction recon

- I'm clueless here, insert the real TKR stuff.

- 6. TKR: Energy recon

- Do the best TKR energy-loss correction, following daughters or whatever.

- 7. CAL: Recalculate energy in each xtal

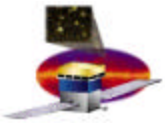
- Use TKR direction. Accounts for failures and light tapering maps.

- 8. CAL: Recalculate total energy deposited

- Total all xtal energies, having accounted for failures and taper.

- 9. CAL: Recalculate simple energy centroid

- Repeat simple centroid, having accounted for failures and taper.



Iterative recon

- Outline of process (cont.)

10. ACD+CAL+TKR: Particle ID (necessary here, or later?)

- Some complicated algorithms to confirm photon or particle.

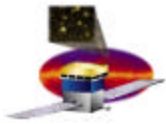
11. TKR(+CAL): Direction recon

- Do the real TKR direction recon. Use CAL info to improve direction for late conversions, if possible.

12. CAL+TKR: Energy recon

- Use best CAL and TKR information to estimate incident energy.
- Use profiling, leakage correlation, TKR info, whatever.

13. Iterate steps 10-12?



CAL-specific needs in PDA
